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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/044,522	01/11/2002	Stan Toncich	UTL 00191	9960

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Kyocera Wireless Corp.
Attn: Patent Department
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EXAMINER

BETTENDORF, JUSTIN P

ART UNIT	PAPER NUMBER
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2817

DATE MAILED: 03/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
10/044,522	TONCICH, STAN
Examiner	Art Unit
Justin P. Bettendorf	2817

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on ____.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-57 is/are pending in the application.

4a) Of the above claim(s) ____ is/are withdrawn from consideration.

5) Claim(s) ____ is/are allowed.

6) Claim(s) 1-57 is/are rejected.

7) Claim(s) ____ is/are objected to.

8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 11 January 2002 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on ____ is: a) approved b) disapproved by the Examiner
If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

- Certified copies of the priority documents have been received.
- Certified copies of the priority documents have been received in Application No. ____.
- Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413) Paper No(s) ____

2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) Notice of Informal Patent Application (PTO-152)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) Other ____

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: "47" in figure 1 (see page 11, line 11). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "interdigital capacitor" (e.g. claims 5 and 24) and "wireless communication device" with a "transceiver comprising a bandpass filter" (see claim 39) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities: Consistent abbreviations should be used throughout the specification to avoid confusion. Presently, the specification uses both "f-e" and "FE" for "ferro-electric" (e.g. see page 2, line 14 and page 4, line 5) plus "RF" and "rf" for "radio frequency" (e.g. see page 12, line 9 and page 14, line 11). Appropriate correction is required.

4. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: The subject matter of claims 3, 5, 8, 10 (i.e., “less than a **fraction**”), 11, 13-16, 22, 24, 27, 29, 32, 46, 48, 49, 51, and 52-54.

Claim Objections

5. Claims 20 and 23 are objected to because of the following informalities: Claim 20 recites “a second capacitor electrode electro-magnetically the ferro-electric material”, which appears to be missing a descriptive term such as --coupled to-- after “electro-magnetically”. Claim 23 recites “capacitor of claim 23”, which is clearly a typographical error that should read --capacitor of claim 20”. Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 2, 4, 6, 12, 20, 21, 23, 25, and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Gikow United States Patent No. 3,569,795.

The Gikow reference discloses in figure 1 a planar tunable gap capacitor comprising: first and second planar capacitor electrodes 12 and 14 with a gap therebetween; a ferroelectric material layer 11 proximate the gap; and a bias electrode 13 below the ferroelectric material

layer 11 and not connected to electrodes 12 & 14 (col. 1, lines 58-65). The reference further *✓* indicates that a variable control ^{DC} voltage is applied (col. 2, lines 48-51), which inherently includes a control signal generator with a DC voltage source. The reference further indicates that the capacitor may be formed on a ceramic substrate (col. 3, lines 1-4).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

✓ 9. Claims 3, 5, 7, 8, 13, 16, 22, 24, 26, 27, 32, 35, 39-46, 50, ⁵¹₅₄ are rejected under 35 U.S.C. 103(a) as being unpatentable over Gikow.

As noted above, the Gikow reference discloses a planar tunable ferroelectric capacitor that is formed on a substrate but does not disclose various parameters (e.g. 3.0 micron gap as recited in claim 3, 22, 41; interdigital capacitor as recited in claims 5, 24, 43; use of MgO as substrate material as recited in claims 7, 26, 45; use of platinum for electrode material as recited in claims 8, 27, 46; 1 micron thickness of FE layer as recited in claims 13, 32, 51; and BST as the FE material as recited in claims 16, 25, 54).

Nevertheless, as would have been well known, the size of the gap and thickness of the material are considered as result-effective variables.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the recited values in the tunable capacitor of Gikow because, as the

parameters are considered result-effective variables, it would have been considered a mere optimization involving only routine skill.

With respect to the recitation of interdigital capacitor, such a modification would have been considered an obvious substitution of art-recognized equivalent capacitor structures.

With respect to the use of MgO for the substrate or platinum for the electrode material (for example), the Gikow reference is silent as to what materials are used. As would have been well known, MgO and platinum are conventional materials for tunable ferroelectric capacitors. Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the invention to have substituted well-known, art-recognized equivalent MgO and platinum in place of the generic materials of Gikow because, as the reference is silent, any art-recognized equivalent material would have been usable therewith such as the well-known MgO and platinum.

With respect to BST as the material, it should be noted that the reference merely mentions lead strontium titanate as a typical material (col. 3, lines 7-10). Therefore, substituting BST for lead strontium titanate would have been considered an obvious substitution of art-recognized equivalent ferroelectric materials..

With respect to claim 39 “wireless communication device” with a bandpass filter coupled to the tunable capacitor, it should be noted that it is a well-known use for a tunable capacitor to be used to tune a bandpass filter or in a matching circuit in a wireless device. Accordingly, such a modification would have been obvious based on the desired conventional use of the tunable capacitor.

pp 10. Claims 9-11, 14, 15, 17, 18, 28-30, 33, 34, 36, 37, 47-49, 52, 53, ⁵⁵ and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gikow in view of Terashima et al. United States Patent No. 5,965,494.

As noted above, the Gikow reference shows (including the modifications noted above) a tunable capacitor that may be used in a wireless communication device with a bias electrode 13 but does not disclose the thickness of the bias electrode.

The Terashima et al. reference discloses that the thickness of the bias electrode must be less than a skin depth in order to avoid interaction with the radio wave and suggests 10 nm for a 2GHz application (see col. 7, lines 1-5 and 48-59). By avoiding interaction, loss is decreased (see col. 18, lines 5-20). Furthermore, the reference discloses that forming the bias electrode with “fingers” (i.e., comb form) allows better control (col. 15, lines 64-68 to col. 16, lines 1-4).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the invention to have set the thickness of the bias electrode much less than the skin depth in the device of Gikow as taught by Terashima et al. (e.g. 10 nm or 0.01 microns at 2GHz or a tenth of the skin depth) because such a modification would have advantageously reduced the field interaction (i.e. attenuation) in the device of Gikow in order to reduce the loss from the bias electrode. Such values recited in the claims would have been considered as mere optimizations and, therefore, obvious.

With respect to forming the bias electrode with “fingers”, such a modification would have been obvious in the device of Gikow because such a modification would have facilitated better control of the capacitor (i.e. increased values) as taught by Terashima et al. thereby suggesting the obvious modification.

11. Claims 19, 38, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gikow in view of Terashima et al. as applied above, and further in view of Hoshiba JP 05-182857.

As noted above, the Gikow/Terashima et al. combination suggests a tunable capacitor in a wireless communication device with a bias electrode having "fingers" but does not show them attached at both ends.

The Hoshiba reference discloses a similar tunable capacitor with bias control electrode 4/B being formed open (figure 1) or closed at both ends (figure 7), thereby disclosing that the two implementations are art-recognized equivalent.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the invention to have substituted closed-ended fingers in place of the open-ended fingers in the device of Gikow/terashima et al. as taught by Hoshiba because such a modification would have been considered a mere substitution of art-recognized equivalent bias finger structures.

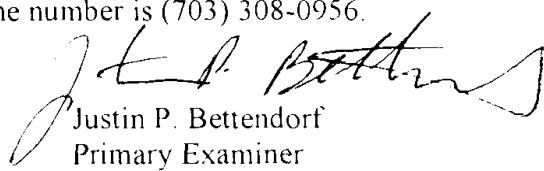
Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. JP 63-128618 discloses a tunable capacitor with separate bias control electrodes from the capacitor electrodes (see figure 4).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin P. Bettendorf whose telephone number is (703) 308-2780. The examiner can normally be reached on 6:00-3:30 (M-F, 1st Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert J. Pascal can be reached on (703) 308-4909. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Justin P. Bettendorf
Primary Examiner
Art Unit 2817

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February 25, 2003